AMENDMENTS TO THE CLAIMS

Claim 1 (Previously Presented): A metal sheet with anticorrosive coating formed from an anticorrosive paint on at least one side thereof, wherein

said anticorrosive paint contains a metallic zinc powder in an amount of 55 - 85 mass% of its solids;

said anticorrosive paint contains at least one kind of metal salt rust inhibitor in an amount of 1 - 20.3 mass% of its solids;

said metal salt is a salt of a metal which is more base than zinc; and

the metal salt rust inhibitor is a fine powder having an average particle diameter no larger than 1 μm.

Claim 2 (Original): The metal sheet with anticorrosive coating as defined in Claim 1, wherein the substrate is a steel sheet.

Claim 3 (Original): The metal sheet with anticorrosive coating as defined in Claim 1, wherein the coating film has a thickness ranging from 5 μm to 30 μm.

Claim 4 (Original): The metal sheet with anticorrosive coating as defined in Claim 1, wherein the metallic zinc powder has an average particle diameter ranging from 0.01 μm to 20 μm.

Claims 5-7 (Canceled)

Claim 8 (Original): The metal sheet with anticorrosive coating as defined in Claim 1, wherein the metal salt rust inhibitor is a phosphate.

Claim 9 (Original): The metal sheet with anticorrosive coating as defined in Claim 1, wherein the metal salt rust inhibitor is a phosphomolybdate.

Claim 10 (Original): The metal sheet with anticorrosive coating as defined in Claim 1, wherein a phosphate coating film is interposed between the metal sheet and the coating film of the anticorrosive paint.

Claim 11 (Previously Presented): A method of making a metal sheet with anticorrosive coating, the method comprising

coating an anticorrosive coating on a metal sheet; and

producing the metal sheet with anticorrosive coating as defined in Claim 1.

Claim 12 (New): The metal sheet with anticorrosive coating as defined in Claim 1, wherein said metal salt is a salt of Al, Ca or Mg.

Claim 13 (New): The metal sheet with anticorrosive coating as defined in Claim 1, wherein said metal salt is a salt of Ca.

SUPPORT FOR THE AMENDMENTS

This Amendment adds new Claims 12-13. Support for the amendments is found in the specification and claims as originally filed. In particular, support for Claims 12-13 is found in the specification at least at page 4, lines 19-21. No new matter would be introduced by entry of these amendments.

Upon entry of these amendments, Claims 1-4 and 8-13 will be pending in this application. Claim 1 is independent.

REQUEST FOR RECONSIDERATION

Applicants respectfully request entry of the foregoing and reexamination and reconsideration of the application, as amended, in light of the remarks that follow.

The present invention provides a metal sheet with an anticorrosive coating formed from an anticorrosive paint containing metallic zinc powder and at least one kind of metal salt rust inhibitor, where the metal salt is a salt of a metal that is more base than zinc.

Corrosion prevention by zinc has long been known, and metal salt rust inhibitors are also known. Specification at page 4, lines 4-6.

However, the present inventors are the first to find that a marked anticorrosive effect is produced by the ***combination*** of zinc powder with a metal salt rust inhibitor, where the metal salt is a salt of the metal which is ***more*** base than zinc. Specification at page 4, lines 6-10.

When a solution is formed from a combination of zinc powder with a metal salt rust inhibitor whose metal is ***less*** base than zinc, ions the metal of the rust inhibitor deposit in place of zinc. Thus, zinc is ionized in place of the metal of the rust inhibitor. This promotes corrosion of the metal sheet.

As discussed in the specification at page 4, lines 10-12, the mechanism of the anticorrosive effect of the present invention is not well known. However, according to Applicants' present understanding, when pH is too high or too low, the metal salt rust inhibitor of the present invention dissolves to make the pH more neutral whereby zinc salts having a protective effect against corrosion are generated.

Claims 1-4, 8 and 11 are rejected under 35 U.S.C. § 103(a) over EP 0722933 A1 ("Shinohara"). In addition, Claim 6 is rejected under 35 U.S.C. § 103(a) over Shinohara and further in view of U.S. Patent No. 4,294,808 ("Wasel-Nielen"). Claim 9 is rejected under 35 U.S.C. § 103(a) over Shinohara and further in view of U.S. Patent No. 4,040,842 ("Mekishima"). Claim 10 is rejected under 35 U.S.C. § 103(a) over Shinohara and further in view of U.S. Patent No. 6,117,251 ("Rivera").

Claim 6 has been incorporated into independent Claim 1.

Applicants traverse the rejection of Claim 6, as it applies to independent Claim 1, because any *prima facie* case of obviousness based on the cited prior art is rebutted by the significant improvement in corrosion resistance that is achieved by the invention of Claim 6 with the combination of zinc powder and metal salt rust inhibitor, where the metal salt rust inhibitor is a fine powder having an average particle diameter no larger than 1 μm.

The Final Rejection at page 5, section 16, admits that Shinohara "does not teach the use of a metal salt rust inhibitor having an average particle diameter no larger than 1 μm", but asserts that Wasel-Nielen suggests this feature of Claim 6. However, Wasel-Nielen discloses anticorrosive pigments where at least 90% of the particles have a size between 0.05 and 8 μm. Wasel-Nielen at abstract. Wasel-Nielen is silent about the Claim 6 feature of "an average particle diameter no larger than 1 μm". Furthermore, the cited prior art fails to suggest the significant improvement in corrosion resistance provided when the average particle diameter is no larger than 1 μm, which is illustrated in the specification at Table 1,

reproduced below, by comparing the good corrosion resistance of Sample No. 9 of the present invention having a metal salt (calcium phosphate) average particle diameter of 0.65 μm with the poor corrosion resistance of comparative Sample No. 13 having a metal salt (calcium phosphate) average particle diameter of 2.55 μm.

Table 1

Sample No.	Metal sheet	Surface prepa-ration	Zinc powder (mass%)	Metal salt rust inhibitor			Pitting corrosion resistance	Red rust resistance	Corrosion resistance after coating
				Kind	Average particle diameter (μm)	Amount used (mass%)			
1	Cold rolled steel sheet	None	65	Aluminum phosphomolybdate	0.38	5.83	A	A	B
2	Cold rolled steel sheet	None	65	Magnesium phosphate	0.37	5.72	A	A	B
3	Cold rolled steel sheet	P (0.8)	85	Magnesium phosphate	0.37	2.02	A	A	A
4	Cold rolled steel sheet	P (0.8)	65	Magnesium phosphate	0.48	6.00	A	A	A
5	Cold rolled steel sheet	P (0.9)	65	Aluminum phosphomolybdate	0.35	1.63	A	A	A
6	Cold rolled steel sheet	P (0.7)	65	Aluminum phosphomolybdate	0.46	5.66	A	A	A
7	Cold rolled steel sheet	P (0.7)	65	Magnesium phosphate plus Aluminum phosphomolybdate	0.45 0.38	1.89 3.52	A	A	A
8	Cold rolled steel sheet	P (2.1)	80	Magnesium phosphate	0.89	10.3	A	A	A
9	Cold rolled steel sheet	P (2.7)	75	Calcium phosphate	0.65	4.53	A	A	A
10	Cold rolled steel sheet	P (0.3)	55	Aluminum phosphomolybdate	0.75	20.3	A	A	B
11	Cold rolled steel sheet	P (2.0)	65	Magnesium phosphate	0.89	30.5	B	B	A
12	Cold rolled steel sheet	P (2.7)	75	Calcium phosphate	1.35	6.52	B	B	A
13	Cold rolled steel sheet	P (2.2)	75	Calcium phosphate	2.55	5.83	B	B	B
14	Cold rolled steel sheet	P (2.2)	38	Magnesium phosphate	0.75	7.85	B	C	B
(1)	Cold rolled steel sheet	None	None	None	--	--	C	D	C
(2)	Cold rolled steel sheet	None	65	None	--	--	C	D	C
(3)	Cold rolled steel sheet	P (0.8)	65	None	--	--	C	D	C

Parenthesized sample Nos. indicate comparative samples.

In the column of surface preparation, "P" denotes phosphate coating and the parenthesized number that follows P denotes the coating weight (g/m^2).

Because the cited prior art fails to suggest the significant improvement in corrosion resistance that is achieved by the invention of Claim 6 with a combination of zinc powder and the metal salt rust inhibitor, where the metal salt rust inhibitor is a fine powder having an average particle diameter no larger than 1 μm, any *prima facie* case for the obviousness of Claim 6, now incorporated into independent Claim 1, is rebutted and should be withdrawn.

The Advisory Action dated April 14, 2004, asserts that Applicants' data conflicts between samples and type of rust inhibitors. In particular, the Advisory Action states:

> Applicant's examples 9 and 12-13, as presented in Table 1, "appear" to establish that reducing the particle size of calcium phosphate has some impact on the properties of the anti-corrosive film, with samples having a particle size < 1 μ having better corrosion resistance. However, samples utilizing magnesium phosphate clearly do not exhibit the same improved corrosion resistance though the rust inhibitor has the required particle size. Further, samples 1 and 6, which utilize aluminum phosphomolybdate, do not support the applicant's argument of unexpected results. The table below (data is copied exactly from the table 1) helps to clarify this point.

Sample	Rust inhibitor	Average particle diameter	Amount used	Pitting resistance	Red Rust resistance	Corrosion resistance after coating
1	Aluminum phosphomolybdate	.38μ	5.83 mass %	A	A	B
6	Aluminum phosphomolybdate	.46μ	5.66 mass %	A	A	A

> As can be seen, sample #1 has **worse** corrosion resistance than example #6, though it is similar in most respects to sample #6 aside from the fact that it has a smaller particle size. Thus, as the applicant's data conflicts between samples and types of rust inhibitors, it is not persuasive. Advisory Action dated April 14, 2004, at page 2, line 17 to page 3, line 13 (emphasis in original).

However, the table in the Advisory Action omits surface preparation data in Table 1 that shows that Sample Nos. 1 and 6 cannot be compared in terms of only average particle diameter.

Table 1 shows that Sample No. 1, with no surface preparation, exhibited inferior "corrosion resistance after coating" than Sample No. 6, which received a phosphate surface

preparation. As discussed in the specification, phosphate treatment improves corrosion resistance after coating.

> The metal sheet with anticorrosive coating which is covered by the present invention exhibits sufficient corrosion resistance owing to the anticorrosive paint applied thereto even though it has no phosphate treatement. However, for **better corrosion resistance** after coating, it is desirable to previously perform **phosphate treatment** on the metal sheet surface or the plating surface. Specification at page 6, lines 4-10 (emphasis added).

Thus, the difference in "corrosion resistance after coating" exhibited by Sample No. 6 relative to Sample No. 1 results from the difference in surface preparation. Contrary to the assertion in the Advisory Action dated April 14, 2004, Applicants' data does not show a conflict between comparable samples.

In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Applicants respectfully request favorable consideration and prompt allowance of the application.

Should the Examiner believe that anything further is necessary in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,

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